

## THE PRESENT POSITION OF MUSCOLOGY IN VICTORIA

### (A Centennial Review)

by

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Mr. G. O. K. Sainsbury, the eminent New Zealand authority on mosses, wrote in *Revue Bryologique* (n.s. Vol. 14, p. 30, 1944):

Bryological research on the Australian continent has been so desultory that it is impossible to estimate the probability of any future discovery.

Insofar as Victoria is concerned, such a rebuke is well-founded. Collections and accurate determinations of the moss flora have only been made from relatively few, scattered centres, while vast areas of the State (including several northern counties) have never been worked bryologically at all. During the 42 years between February 1905 and February 1947 no additional records were made to the State's moss flora and only a few quite inconsequential (and not very accurate) lists were published in natural history journals. The situation with the State's hepatic flora is as bad, or worse.

Interest in our *Musci* has always been at a low ebb and workers in this neglected field have been surprisingly few—probably because of the discouraging lack of literature, not to mention the difficulties of keeping in close touch with experts overseas. Tasmania has fared much better. Its rich bryophytic flora is fairly well known and at least three major accounts of it have been published (the first by J. D. Hooker in 1858, the last by L. Rodway between 1912 and 1916); indeed, the Tasmanian bryophyte manuals are invaluable to anyone wishing to work out species in Victoria, since the majority are common to both States.

#### HISTORICAL NOTES ON THE STUDY OF VICTORIAN MUSCI

Nothing whatever was known about Victorian mosses or hepatics before the arrival here of Dr. (later Baron Sir) Ferdinand von Mueller in 1852; but by October 1854 Mueller was able to compile the first moss census for the Colony—a list of 70 species published as part of the *Second General Report of the Government Botanist*, 1854, p. 17. He had collected them all himself during exploratory trips in various parts of Victoria, and had submitted his specimens to the Hanoverian bryologist E. Hampe who, in collaboration with C. Müller, described 17 of them as new to science [*Linnaea* 26: 489-505 (1853)]. Another 72 species were added to the list in the *Annual Report of the Government Botanist* for 1858, p. 12—largely as a result of Mueller's activity in the high alpine and subalpine country (Mt. Wellington, Mt. Loch, Mt. Feathertop, Mt. Buffalo, the Cobboras, Grampians, etc.). Again, Hampe had made most of the determinations and there were 20 novelties among

them—described in *Linnaea* 28: 203-215 (1856). Hampe's type specimens are now preserved in the British Museum, but there are duplicates of most in the National Herbarium of Victoria.

Simultaneous with his sendings to Germany, Mueller had submitted a large number of specimens to England for examination by W. Mitten who reported on 212 collections of Victorian mosses (besides a few hepatics) in Hooker's *Journal of Botany* 8: 257-265 (1856). There were 110 species involved and 13 were published as new, but in two instances Mitten re-described species that had been diagnosed only a few months previously by Hampe—so his *Meesia macrantha* and *Neckera leptotheca* had to become *M. Muelleri* C. M. & Hpe. (1856) and *N. aurescens* Hpe. (1856) respectively.

No further moss records are listed in Mueller's subsequent Annual Reports to Parliament, but Hampe continued to name material that he received [*Linnaea* 30: 623-646 (1860); 36: 513 (1870), etc.], and after his death in 1880, Baron von Mueller referred all moss specimens either to Mitten in Sussex, England, or C. Müller in Halle, Germany—both authorities described new species. In 1864 the Baron had published Fascicle 1 of an illustrated work entitled *Analytical Drawings of Australian Mosses* (Govt. Printer, Melbourne), but no succeeding parts ever appeared; this is still the only brochure dealing principally with mosses in Victoria—all but 6 of the 20 species figured.

In 1883, Mueller contributed a systematic list of Australian mosses as enumerated by W. Mitten, to the *Proceedings of the Royal Society of Victoria* (19: 49-96). Mitten here brings together many new records for our Colony, but at the same time he synonymizes numbers of the names previously published. Thus revised and considerably augmented, the State's *Musci* stood at 195 species, while the generic and ordinal nomenclature (as adopted by Mitten) was more in conformity with what we use today. The last determinations of Victorian bryophytes by Mitten seem to have been made about 1894; he died at an advanced age in 1906.

About this time, D. Sullivan (school master of Moyston) and F. M. Reader (a chemist, first in Melbourne and later in Dimboola) became keenly interested in mosses and began forwarding large suites of specimens to Dr. C. Müller of Halle. There were very few species in their respective districts that escaped the eye of these local enthusiasts. Whereas Mitten had been inclined to identify Australian mosses with boreal species, Müller erred gravely in the other direction and regarded all our southern forms as endemic. He published "new" species on the slightest pretext and the numbers affecting Victoria rose to fantastic figures. One of the greatest difficulties now confronting Australian muscologists is how to deal with these multitudes of dubious Müllerian "species". Apart from the inaccessibility of some of Müller's writings, many of his type specimens are presumed lost, although Dr. Froehlich recently reported that material of many Australian moss types are in the Vienna Natural History Museum. Occasionally he *did* succeed in describing a species that was new to science, otherwise one might conveniently disregard *in toto* his later contributions

to Victorian bryology—appearing chiefly in *Hedwigia*, 1897/9. Prolonged work among living mosses in Victoria has given the writer a very conservative attitude toward speciation; but there is a marked tendency for northern bryologists, who study only pieces of *exsiccata*, to “split” our species—in so many cases the supposed new entities turn out to be mere habit forms or mutations of old variable ones, with which the experts were unfamiliar.

C. Müller died early in 1899, within four years of the deaths of D. Sullivan (1895) and Baron von Mueller (1896). For the next decade F. M. Reader worked alone on West Wimmera and Grampian mosses, sending his collections to V. F. Brotherus in Finland—Reader died in 1911. Between 1902 and 1905, Rev. W. W. Watts and T. Whitelegge published a “Census Muscorum Australiensium” as two supplements to the *Proceedings of the Linnean Society of New South Wales*. Unfortunately this check-list embraced only acrocarpous mosses, but it remains today as the most recent record available for the major part of our Victorian moss flora, incorporating the various effusions of Carl Müller and giving literary references for all species.

Rev. Watts paid a brief visit to Melbourne in September 1902 and collected 30 species [q.v. *Victorian Naturalist* 21: 141 (Feb. 1905)] of which four were later described as new by Brotherus [*Proc. Linn. Soc. N.S.W.* 41: 575-596 (Dec. 1916)]. This was the last fragment of critical work to be published on Victorian *Musci* until quite recent years.

R. A. Bastow, a government draughtsman who died in 1920, made a large collection of Tasmanian mosses during the 1880's and wrote two noteworthy brochures on the *Musci* and *Hepaticæ* of the Island State. From 1888 until his death he assiduously collected specimens from various parts of Victoria (Melbourne, Healesville, Warburton, Dandenongs, Otways, Buninyong, Lakes Entrance, etc.). All these are now housed in the National Herbarium, South Yarra, together with two large Mss. volumes of moss descriptions and delineations respectively—many are copied from J. D. Hooker's standard works (*Flora Tasmaniae*, *Flora Antarctica* and *Flora Novæ-zelandiæ*.); but, unfortunately, few of the sketches fulfil modern requirements for reproduction. For a long period, Bastow was the only man in Victoria with a good working knowledge of the general moss flora, and with his death collecting practically ceased here for the ensuing 20 years, broken only by a few alpine records of A. J. Tadgell in the Bogong region [q.v. *Vict. Nat.* 41: 70 (Aug. 1924)] and sundry specimens—chiefly from Creswick, Cockatoo and Beenak districts—gathered by the writer.

Between 1910 and 1920, J. Breidahl collected some 160 numbers of Victorian mosses from around Melbourne, the Dandenongs, Healesville, Marysville, Plenty Gorge, Werribee Gorge, Mt. Buffalo and Beech Forest (Otways). These were mostly determined by Bastow (not always accurately), and are now incorporated in the Herbarium, Botany Department, University of Melbourne, where are also housed several collectings by Miss Sybil Church (1938/41) at Lorne, Cowes, Healesville and the Dandenongs.

It is a matter for regret that certain organized natural history expeditions to unfamiliar parts of Victoria (e.g. to the Mallee and Lady Julia Percy Island) within the past quarter of a century have, almost without exception, failed to take stock of the *Bryophyta*—surely the easiest and least bulky of all plants to collect.

#### REVIVED ACTIVITY IN THE PAST DECADE

During 1942 Mr. Frank Robbins took up the study of our mosses and began collecting intensively near his home at Castlemaine, also in the Bendigo, Mt. Macedon and Grampians areas. Every doubtful specimen went to G. O. K. Sainsbury at Wairoa, N.Z., for examination. Within three years he had accumulated a prodigious amount of material and was receiving specimens from several correspondents (notably W. Hunter of Bairnsdale and C. Beauglehole in the Portland district). Since 1947 ill-health has forced Mr. Robbins to abandon bryological researches and his entire collection is now in the possession of Mr. H. T. Clifford, Melbourne. Among several new Victorian records that Robbins established from Castlemaine [see Sainsbury in *Vict. Nat.* 63: 222 (Feb. 1947)] was the type of a remarkable new family *BRYOBARTRAMIACEAE*, described by Sainsbury in *The Bryologist* 51: 9-13, Mar. 1948 [see also R. D. Lee in *Vict. Nat.* 69: 9 (May 1952)].

The late world authority, H. N. Dixon, published (posthumously) in *Notes from the Royal Botanic Gardens, Edinburgh* 20: 93/4 (Mar. 1948) another two new records for Victoria—*Fissidens pachyneuron* and *Campylopus kirkii*.

Through C. Beauglehole's recent field activity in the far South-west we have available almost complete lists of *Musci* for the region between Portland and the Glenelg River, including the Lower Glenelg National Forest (a rich moss area). He has also made collecting excursions to the Grampians, Otways, Colac district, Dimboola, Little Desert and as far afield as the Kulkyne National Forest near Hattah.

H. T. Clifford is now engaged on the preparation of a full modern check-list of Victorian *Musci* (with synonymy wherever known) and, as a forerunner to this important project, he collaborated with the writer [*Vict. Nat.* 68: 135-138 (Dec. 1951), 151-158 (Jan. 1952)] in publishing the names of 32 mosses that had never been recorded previously for the State—most of these are discoveries within the last decade and ten are also new generic records. All specimens about which there was any uncertainty were submitted to G. O. K. Sainsbury (N.Z.), E. B. Bartram (Pennsylvania), A. LeRoy Andrews (New York) or experts in Europe. In the past three years I have published five critical papers, forming a series, "Systematic Notes on Victorian Mosses," through the *Victorian Naturalist* (1. June 1952; 2. July 1953; 3. Jan. 1954; 4. Feb. 1955; 5. May 1955); in the fourth of this series, 15 additional species are added to the Victorian moss flora, and in the fifth two new species are described and illustrated.

When a State check-list has been published, we propose to follow this up with regional distribution data (as far as this is known) for every species—a task involving the examination of copious material housed in



various herbaria, both departmental and private. It is quite impossible for a Herbarium specialist to visit every part of the State, and he must rely upon co-operation by local collectors. Only through the stimulation of sufficient local interest can one fill in much of the remaining blank space on the moss distribution map of the State—the Murray Valley, between Kulkyne and the Cobboras, for instance. The National Herbarium will undertake to determine, as far as possible, and to place on record any satisfactory specimens that correspondents are willing to send along.

A knowledge of what mosses do occur in Victoria and how to recognize them should precede investigations into the more fascinating realms of general ecology (variations with soil and climate), life histories, etc.

Enough is known already to anticipate the total number of species occurring in the State. When synonymies are fully worked out, this figure will most probably be in the vicinity of 250. More than 1900 reliable county-species records are now tabulated (about 58% of the estimated total, 3300), and 9 or more species are known to occur in each of the 37 Victorian counties—County of Buln Buln (including Wilson's Promontory and part of the Baw Baws, up to 5,100 ft.) is richest, with at least 130 species. Mosses which occur in the greatest number of counties are also those regarded as ecological "wides", including some of cosmopolitan range; for example, *Bryum billardieri*, *Campylopus introflexus* (cosmop.), *Ceratodon purpureus* (cosmop.), and *Funaria hygrometrica* (cosmop.) are each known from 31 counties, while *Bryum pachytheca* and *Triquetrella papillata* occur in at least 30.

[NOTE—In May 1955 the Royal Society of New Zealand published, as Bulletin No 5, *A Handbook to the Mosses of New Zealand* by G. O. K. Sainsbury. This welcome book is liberally illustrated with line drawings, has excellent keys to genera and species, and gives a full description of 440 species known to occur in the Dominion. Since 82 per cent. of the Victorian moss flora is represented also in New Zealand and is so adequately treated in this manual, the latter will be of the utmost use to bryologists in our State.]